



CRC-QUERI Clinical Brief #1: *Virtual Colonoscopy*

*The **VA CRC-QUERI** (Colorectal Cancer Quality Enhancement Research Initiative) is dedicated to the translation of research discoveries and innovations into system improvements in order to reduce the incidence, late detection, suffering, and mortality from colorectal cancers among all veterans. This is the first in our new series of Clinical Briefs. Each brief will address a question that we have heard from numerous clinicians. The answers are brought to you by **Drs. John Bond**, clinical co-coordinators of CRC-QUERI.*

What is the potential of virtual colonoscopy as a screening tool at the VA?

The rapidly evolving field of virtual colonoscopy (VC), also referred to as CT colonography, offers a great deal of promise as a means of increasing the VA's capacity for highly accurate CRC screening while also reducing the risk of complications. In VC, data from a rapid helical CT scanner is utilized to construct two and three dimensional images of the colon. These images are analyzed by a radiologist to identify cancerous growths and premalignant polyps.

As with optical colonoscopy, the patient must perform bowel prep. Additionally, patients may be asked to ingest a contrast agent that is used to tag and subtract any remaining bowel contents from processed images. (Advances in fecal tagging technology may eventually eliminate the need for bowel cleansing.)

Immediately prior to scanning, the colon is insufflated with air using a rectal catheter. This can cause some discomfort. However, the procedure takes only a few minutes, requires no sedation, and is generally found to be preferable overall to conventional colonoscopy by patients¹. Additionally, because VC is minimally invasive, the risk of complications is less than with endoscopic procedures.

Although a recent meta-analysis found VC's overall sensitivity and specificity for detecting clinically significant polyps to approach the detection rate of optical colonoscopy, VC sensitivity was highly variable across studies (range: 48% to 100%)². Much of this variance may be due to the types of scanners, software, analytic techniques employed. Among the seven studies that used multi-slice scanners, sensitivity was uniformly high at 95%. The two studies in the meta-analysis that utilized fly-through software technology, which simulates the viewing experience of optical colonoscopy, obtained a combined sensitivity of 99%.

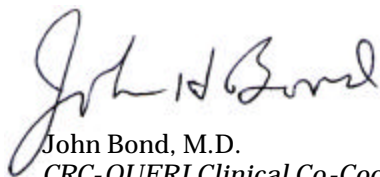
The American College of Radiology Imaging Network (ACRIN) is currently conducting a 15-site trial that may help to clarify VC's near-term viability as a screening tool. (Protocol available at http://www.acrin.org/6664_protocol.html.) In addition to examining the relative accuracy of both VC and optical colonography, this study has been designed to compare different image analysis techniques and to assess variation between radiologists in the interpretation of cases. Preliminary results are expected to be available in the fall of 2006.

Analysis of the ACRIN study will include cost-effectiveness modeling, addressing another key hurdle in VC implementation. Any such economic assessment will need to incorporate the cost of endoscopies following all positive VC screens. It is important to note, however, that this cost may be partially offset by the fact that VC occasionally identifies and leads to the early treatment of extracolonic health problems such as hepatic steatosis, gallstones and hernias.

If the findings of the ACRIN study warrant, VC may find its way on to the list of screening modalities recommended by the US Preventive Services Task Force and other organizations. While such recognition is likely to be several years away, it is not too early to begin considering the challenges associated with implementing VC screening at the VA.

- In terms of capital needs, **4-slice scanners equipped with the appropriate VC software appear to be sufficient**³. More advanced scanners may offer slight improvements in fine imaging, but do not appear to significantly improve the probability of detecting the large polyps that are most likely to develop into cancer.
- The ACRIN study should provide some clarity on the minimum hardware and software needs for image analysis. A review of the studies to date, however suggest that for accuracy to be on par with optical colonoscopy, it may be necessary to use a **system that can quickly create 3D flythrough images**.
- A consensus on reader training requirements appears to be developing⁴. In addition to attending a **formal training course** many suggest readers **review a library of at least 50 training cases**.
- When setting up a VC screening program one should also consider the benefits of **coordinating efforts between radiology and gastroenterology**. If a system is in place that allows same day endoscopic polyp removal following a positive VC screen, the need for a second appointment and second bowel cleansing can be eliminated.

A variety of other issues in the areas of staffing, administration, and patient and provider education will also need to be addressed if virtual colonoscopy is to become a front line screening tool in the VA. However, when one considers the rapid advances that are being made in this young field and the current state of the evidence base, identifying these issues today may result in considerable future benefit.



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In the next CRC- QUERI Clinical Brief, we begin a series examining the steps required to successfully follow up a positive CRC screen (using fecal occult blood test, flexible sigmoidoscopy, or barium enema) with a complete diagnostic exam. The VA is well above the national average in screening age 50 plus average risk patients (74% at the VA compared to 44% national average). However, less than half of those screened positive successfully complete a colonoscopy exam within 6 months. By improving in this area, the VA can increase the efficacy of CRC screening programs and decrease the number of veterans whose lives are lost to colon cancer.

¹ Svensson MH, Svensson E, Lasson A, Hellström M: Patient acceptance of CT colonography and conventional colonoscopy: prospective comparative study in patients with or suspected of having colorectal disease. *Radiology* 222(2):337-45, 2002.

² Mulhall BP, Veerappan GR, Jackson JL: Meta-analysis: computed tomographic colonography. *Ann Intern Med* 142:635-50, 2005.

³ Pickhardt PJ, Taylor AJ, Johnson, GL, et al.: Building a CT colonography program: Necessary ingredients for reimbursement and clinical success. *Radiology* 235:17-20, 2005.

⁴ Soto JA, Barish MA, Yee J: Reader Training in CT Colonography: How Much Is Enough? *Radiology* 237:26-27, 2005.

Tentative Schedule for Future CRC-QUERI Clinical Briefs

- December, 2005: **Virtual Colonoscopy (Issued)**
- March, 2006: **From Positive Screen to CDE:
Minimizing Inappropriate FOBT Tests**
- June, 2006: **From Positive Screen to CDE:
Provider Issues**
- September, 2006: **From Positive Screen to CDE:
Patient Issues**
- December, 2006: **From Positive Screen to CDE:
Systems Issues**
- March, 2007: **FOBT:
What proportion should test positive?**
- June, 2007: **Aspirin in CRC prevention**
- September, 2007: **The use of clinical reminders in CRC screening and
follow-up**
- December, 2007: **Group-prep for colonoscopy**